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ABSTRACT

The Wisconsin Design for Reading Skill Development is a vehicle for implementing a skills-centered approach to reading instruction. The components of the design are (1) management guidelines; (2) an essential skills list for six areas (word attack, comprehension, study skills, self-directed reading, interpretive reading, and creative reading) and behavioral objectives for each area; (3) instructional guidelines including a teacher's resource file; and (4) assessment measures which permit teachers to focus upon behaviors related to specific skills. Manuals are provided to assist with the implementation of the design. The design is supported by three kinds of empirical evidence: (1) reliability and validity investigations of the skills-related criterion-referenced tests (the individual tests were serving a purpose not met by the more formal group tests); (2) evidence that implementation of the design has a salutory effect on reading achievement (the comprehension and study skills phases of the design are yet to be implemented); and (3) data showing that teachers can realistically set and successfully pursue specific skill-attainment goals. Tables and references are included. (AW)

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THE WISCONSIN DESIGN FOR READING SKILL DEVELOPMENT

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Many reading teachers operate on the basis of a very straightforward assumption: If essential subskills are mastered, then functional reading ability will be attained. While this assumption seems perfectly reasonable, the fact is that it has never had a systematic, large scale test. Reduced to fundamentals, development of the Wisconsin Design for Reading Skill Development and its subsequent field test amount to a test of the assumption. A product of the Wisconsin Research and Development Center for Cognitive Learning, the Design comprises the components that appear to be essential to the implementation of a skill centered approach to reading instruction.

The Design, then, is a vehicle for implementing a skill centered approach to reading instruction. In this paper a framework for development of the Design, characteristics of the Design, and empirical support for skill centered instruction are considered.

A Framework for Organizing Skill Development

If teachers are to be very effective in facilitating children's reading skill development, they must first focus on a number of things.

They must decide (1) exactly what they want children to learn, (2) who already knows it, (3) how they can teach it to those who do not, and (4) how to decide when they have learned it (Frieder, 1970). That is, they must have an organized approach to teaching.

The framework for organizing instruction that has guided the development of the Design includes the following elements: identification of essential content, statement of objectives, assessment, identification of appropriate teaching/learning activities, and evaluation.

1. Identification of Essential Skills. The most basic task is to identify content considered to be essential to success in a given area. Unless and until this is done there can be no straightforward approach to instruction. Yet, the fact is that up to the present time efforts to specify essential content have been rare and not very definitive except in the basic skill areas, where essential content amounts mainly to essential skills. In the reading area it is possible to identify "essential" skills with consensual, historical and limited, but implicit, empirical support.

2. Statement of Objectives. Adequately stated objectives specify the criterion behaviors related to each essential skill. They specify the operational mastery levels that become the absolute or criterion referents for judging the adequacy of performance.

3. Assessment. Objectives that serve to define essential skills in terms of observable behaviors make possible the assessment of individuals' skill development status through the use of formal, paper-

and-pencil tests or informal observation of relevant behaviors. Assessment permits the teacher to determine which skills have and which have not been mastered.

In a skill area like reading, objectives that are related to essential skills ought to specify mastery levels. Each pupil should be expected to attain mastery--e.g., 80% or better of test items related to the objective--of each objective. A pupil's performance, then, is assessed with regard to an absolute or criterion referent--i.e., the objective--rather than a relative referent--i.e., the performance of his peers. Mastery learning is gaining solid support in all areas (Bloom, 1968; Bruner, 1960; Carroll, 1963; Mayo, 1970); we feel it is imperative in the basic skill areas where foundations are laid for subsequent learning.

4. Identification of Appropriate Teaching/Learning Activities. Efficient reading instruction depends on objectives and assessment: the teacher who knows what constitutes adequate performance is in a position to determine the current skill development status of individuals. Once specific needs have been identified, the teacher is in a position to devise appropriate instruction. In practice, this means that the teacher selects from the array of available instructional materials and activities those that appear to be most appropriate for a given pupil in a given situation at a given point in time.

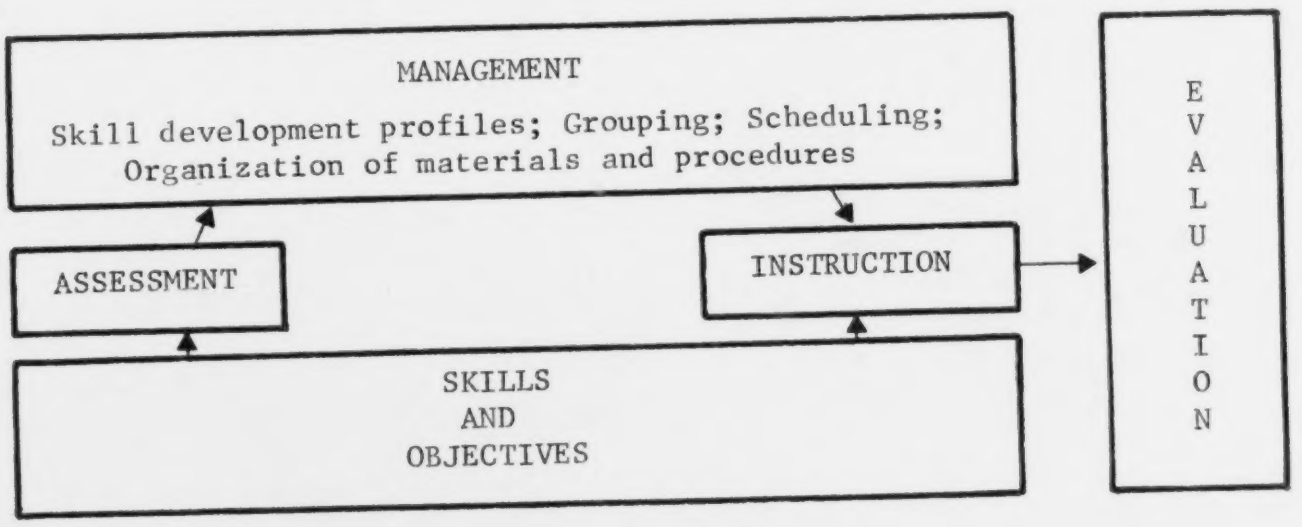
This is, in our opinion, the place at which the teacher must assume major responsibility. At the present time virtually no

definitive knowledge has been generated regarding the systematic matching of pupils and instruction. Thus the task of working out the details of instruction rests squarely with the teacher. Yet, while there will always be a number of ways to pursue a given objective, well stated objectives will, at the very least, specify the goals of instruction.

5. Evaluation. The pay-off from application of the present framework ought to be functional reading ability, the ability to cope with the reading tasks encountered both in and out of school. If the desired end product is not forthcoming, then there is reason to examine each of the components to determine where the process has broken down.

The framework is summarized in the schema that follows. A management component is added in the schema because our experience has shown that means for helping teachers get it all together are required if the framework is to be workable. The management component is a vital aspect of the Design.

Framework for Organizing Skill Development



Characteristics of the Wisconsin Design

The Design includes the components that experience has shown to be necessary for successful implementation of the framework just described.

In developing the Design, the skills included in a broad definition of reading were divided into six areas: Word Attack, Comprehension, Study Skills, Self-Directed Reading, Interpretive Reading, and Creative Reading. The skills included were originally drawn from the carefully prepared curriculum guide of a public school system. The list has subsequently been refined in view of feedback from teachers and reading specialists who have worked with the list in the field, extensive reviews of the related literature and instructional materials, the opinions of authoritative reviewers, and experience in pilot situations.

Within the six areas the skills are clustered at levels that correspond generally to traditional grade levels. The skill areas and traditional grade level equivalents of the skill levels are shown in the schema that follows. The grade designations are given only for transition purposes as the Design is adopted; the recommendation is that the grade designations be ignored as soon as a continuous progress approach to skill development becomes operational.

Skills by Area and by Traditional Grade Level

Skill Area	Grade K	1	2	3	4	5	6
Word Attack	A	B	C	D	--	--	--
Comprehension	A	B	C	D	←	E	→
Study Skills	A	B	C	D	E	F	G
Self-Directed Reading	A	B	C	D	←	E	→
Interpretive Reading	A	B	C	D	←	E	→
Creative Reading	A	B	C	D	←	E	→

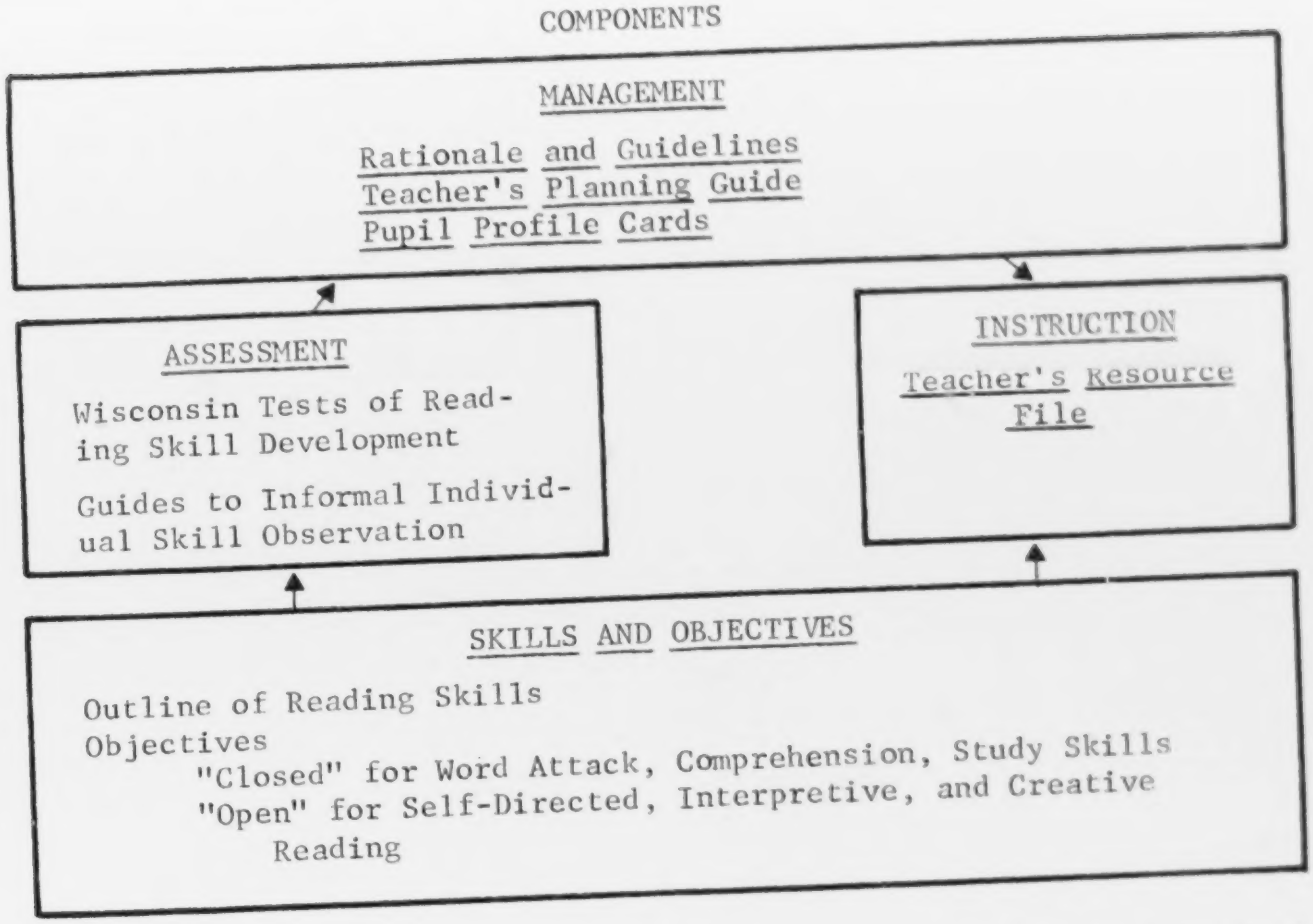
Word attack skills are not given beyond Level D because the essentials are introduced and taught to the average child by the end of the primary grades. Skills in the other areas, excluding the study skills area, are clustered at Level E for Grades 4-6 because traditionally the middle grades have been the place for consolidating and refining reading skills. After an intensive review of the study skills area, however the decision was to continue the sequential clustering of study skills for the middle grades.

In addition to the list of essential skills for each area, the Design includes a specific objective stated in behavioral terms for each skill in the Word Attack, Comprehension and Study Skills areas and "open" objectives for the remaining areas; machine scorable criterion referenced tests and/or guides to informal assessment for each behavioral objective; pupil profile cards that permit the systematic grouping and re-grouping of pupils according to skill develop-

ment needs; and resource files of suggested published materials and teaching procedures keyed to specific skills for use in instruction. Thus, the Design provides a skill development framework for an elementary school reading program, a means for monitoring individuals' progress in skill development, and a management system for both pupils and instructional materials. The procedures suggested are compatible with but not tied to any particular instructional set-up (e.g., basal reader centered, classic individualized, or language experience). In addition, manuals are provided to assist with the implementation of the Design. A Rationale and Guidelines manual is addressed to central office personnel, principals, etc. who will provide leadership in planning and providing for implementation. Underlying assumptions regarding the Design and requisites of a total reading program are considered as well as specific guidelines for implementation. A Teacher's Planning Guide is limited to the specifics required for implementation in the classroom. Both manuals reflect several years' experience in schools that have collaborated in developing the Design. [See Otto and Askov (1970) for a more detailed description of the Design and its components.]

In the schema that follows, components are placed in the framework. The assessment components permit teachers to focus upon behaviors related to specific skills, thereby permitting them to design instruction in view of the skill related performance of individual pupils.

Wisconsin Design for Reading
Skill Development



The Design amounts to a means for testing an important hypothesis derived from the basic assumption that underlies its development: A skill development focus in reading will result in improved overall reading achievement. A large scale field test, involving 30 schools, is now underway with the word attack phase of the Design, and the data gathered will permit a test of the hypothesis. There is, however, already available certain support for a skill-centered approach to reading instruction.

Empirical Support for the Skill Development Approach

Three kinds of support have been sought.

1. Because the approach taken in the Design revolves around the assessment of specific skills, the reliability and validity of the skill related criterion referenced tests that are a component of the Design have been examined.

Content validity is, of course, the foundation of validity evidence for criterion referenced tests: in the area of word attack, skills were identified, behavioral objectives were written, and a separate test was constructed to measure the behaviors described in each objective. The resultant tests, the Wisconsin Tests of Reading Skill Development: Word Attack, are machine scorable to permit rapid handling and generally limited to fifteen items to permit rapid administration. In general, the Hoyt reliability coefficients for the tests, based on try-outs with at least one hundred children, range in the .70s or better. (See Table 1.) Thus, the feasibility of devising short, reliable skill assessment tests has been demonstrated, and the groundwork for a skill-centered approach is laid.

There is evidence, too, of low to moderate intercorrelations among the individual skill tests. This amounts to evidence for the validity of the choice of skills, for it suggests that each subtest is measuring an ability that is somewhat specific and, therefore, necessary or "essential." Low to moderate correlations among scores on individual skill tests and standardized reading achievement tests

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TABLE 1
Wisconsin Tests of Reading Skill Development
Test Reliability Data
(from Fischbach, Harris and Quilling, 1970)

Level & Subtests	Number of Respondents	Number of Items	Mean Score	Spread of Scores	Hoyt Reliability	Evaluation Test	Evaluation Items
Level A	109						
Rhyming Words		15	10.29	1-15	.84	S[1]	S
Rhyming Phrases		15	11.45	3-14	.73 (.79)[5]	S	R
Shapes		15	12.70	5-15	.81	S	S
Letters & Numbers		15	14.18	10-15	.56 (.75)	R(S)	S
Words & Phrases		15	11.71	4-15	.74	S	S
Initial Consonants		15	7.97	1-15	.84	S	R
Level B	105						
Sight Vocabulary		20	13.68	5-20	.60 (.74)	R(S)	R
Beginning Consonant Sounds		20	16.45	7-20	.76	S	R
Ending Consonant Sounds		19	13.94	6-19	.75 (.80)	S	R
Consonant Blends		20	14.99	4-20	.86	S	S
Short Vowels		13	8.05	1-13	.81	S	R
Consonant Digraphs		18	10.20	5-15	.34	R[3]	R
Compound Words		20 (17)	13.66	5-20	.80 (.82)	S	R-D[4]
Contractions		15	7.31	1-14	.75	S	R
Base Words & Endings		14 (11)	7.57	1-14	.80 (.80)	S	R-D
Plurals		20 (12)	15.42	4-20	.75 (.81)	S	R-D
Possessives		30	20.19	11-30	.77	S	R-D
Level C	113						
Sight Vocabulary		20 (15)	16.04	7-20	.72 (.77)	S	R-D
Consonants & their Variant Sounds		42 (30)	27.43	9-41	.79 (.84)	S	R-D
Consonant Blends		15	12.99	2-15	.86	S	S
Long Vowel Sounds		40 (30)	31.89	10-40	.92 (.91)	S	R-D
Vowel + r, a + l, a + w		14	8.69	1-14	.81	S	S
Diphthongs		15	10.93	2-15	.82	S	S
Long & Short oo		15	10.13	4-15	.70	S	S
Consonant Digraphs		15	11.58	5-15	.70	S	S
Base Words		14	10.60	5-14	.72	S	R
Plurals		12	10.22	2-12	.80	S	S
Homonyms		15	11.12	4-15	.61	A[2]	R
Synonyms-Antonyms		14	8.15	2-13	.60	R	A
Multiple Meanings		12	9.18	3-12	.66	A	A
Level D	101						
Sight Vocabulary		25	20.84	10-25	.74	S	R-D
3-Letter Consonant Blends		18	14.38	2-18	.85	S	S
Silent Letters		14 (15)	7.94	1-14	.72 (.86)	S	R
Syllabication		15	10.31	3-15	.70	S	R
Accent		12	6.92	2-11	.32	R	R
Schwa		14	7.64	1-14	.69	A	R
Possessives		15	7.62	2-15	.73	S	R

[1] Reliability or β coefficient is satisfactory ($r_{ii} \geq .70$)
[2] Reliability or β coefficient is minimally acceptable ($.60 \leq r_{ii} > .70$)
[3] Reliability or β coefficient is unacceptable; revisions necessary ($r_{ii} \leq .60$)
[4] Items of lower than average β coefficients were deleted
[5] Reliability after revisions reported in parentheses

are evidence that the behaviors measured by the tests are related to overall reading skills. However, since these correlations are only moderate, it can be inferred that the Wisconsin Tests of Reading Skill Development are also measuring slightly different abilities from general reading achievement tests--i.e., specific skill acquisition. (See Fischbach, Harris & Quilling, 1970, for further details.)

Another type of investigation of the validity of the Wisconsin Tests of Reading Skill Development was reported by Fischbach (1971). He tested the hypothesis that reading mastery scores (i.e., number of skills mastered at a given level) should be positively related in a simple manner to scores on independent measures of reading achievement. Using regression of reading achievement scores on mastery scores at six grade levels, Fischbach found the expected relationship at all except one grade level, where the relationship was somewhat more complex. In other words, as the number of reading skills mastered at a given level increased, grade-equivalent scores on widely used reading achievement tests also increased. Although these results did not "prove" the validity of the Wisconsin Tests of Reading Skill Development--for content validity had already been established for the word attack skill tests--they did permit a check for any gross deficiencies, which were not found.

Another indication of the validity of criterion referenced testing is derived from a study of the relationship between the machine scorable group tests discussed above and informal individual assessment exercises written for the same objectives (Blank, 1970). Both

types of assessment devices were devised for reasons aptly stated by Trismen (1967) "...curriculum evaluation studies should include both individual and group measures of various types. Presumably these various approaches would yield different information, and comparisons among the results should provide a better understanding of the complexities of the classroom situation." Although the correlations between the groups and individual tests were not high, the low but positive correlations were interpreted as an indication that the individual tests were serving a purpose not met by the more formal group tests. In other words, the two types of tests generally tap a common cluster of behaviors; but each apparently goes beyond the common elements, as common sense would suggest.

2. Evidence that implementation of the Design has a salutary effect on reading achievement as measured by independent tests has been sought.

The ultimate test of the skill development hypothesis is whether there is a generally salutary effect on reading achievement as measured by independent tests. Here again the limited data that are available at the present time tend to be encouraging. The data summarized here were reported by Quilling (1971), and the summary tables presented are adapted from her report.

Achievement data were gathered from two elementary schools in the spring of the year preceding implementation of the Word Attack phase of the Design and again in the spring of a pilot year of implementation. Data gathered after implementation were compared to

baseline data gathered immediately before implementation.

Results from the Doren Diagnostic Reading Test of Word Recognition Skills for School A are given in Table 2.

Table 2

Mean Performance of Second Graders on the Doren Diagnostic Test in May, 1969 and May, 1970. School A. (from Quilling)

	SCHOOL A		
	May, 1969	May, 1970	Difference
Total Score	76.6	83.0	6.4**
Letter Recognition	8.2	9.1	.9
Beginning Sounds	8.4	8.7	.3
Word Recognition	14.2	14.5	.3
Speech Consonants	4.4	4.5	.1
Ending Sounds	9.7	10.6	.9
Blending	6.9	7.4	.5
Rhyming	4.9	5.2	.3
Vowels	16.2	18.5	2.3
Homonyms	3.8	4.2	.4

**Significant at .01 level

The difference between mean total scores clearly favors the experimental group ($p < .01$) and the performance on all subtests was higher after implementation. Results from the Gates-MacGinitie Reading Tests are given in Table 3. All of the mean grade equivalents were improved after implementation.

Table 3

Mean Performance in Grade Equivalents of Primary Pupils in School A on Gates-MacGinitie Reading Tests in May, 1969 and May, 1970. School A. (from Quilling)

	Vocabulary		Comprehension	
	May, 1969	May, 1970	May, 1969	May, 1970
First Grade	1.8	2.2	1.9	2.1
Second Grade	2.8	3.2	2.8	3.1
Third Grade	3.6	3.8	3.7	3.8

The data from School B are more limited: due to timing of the local testing program complete data were available only for second graders and the Stanford scores for third graders were obtained in March rather than May. Doren scores are summarized in Table 4. Again, the 1970 scores are higher than those from the previous year, but the

Table 4

Mean Performance of Second Graders on the Doren Diagnostic Test in May, 1969 and May, 1970. School B. (from Quilling)

	SCHOOL B		
	May, 1969	May, 1970	Difference
Total Score	83.4	86.5	3.1
Letter Recognition	9.1	8.9	.2
Beginning Sounds	8.8	8.8	0.0
Word Recognition	14.6	14.6	0.0
Speech Consonants	4.3	4.5	.2
Ending Sounds	11.3	11.5	.2
Blending	7.1	8.2	.9
Rhyming	5.5	6.2	.7
Vowels	18.7	20.3	1.6
Homonyms	3.9	4.0	.1

gains are not as great as for School A, nor do they reach a comparable level of significance ($p < .15$). [We should note here the histogram plots reported by Quilling show less negative skew after a year's implementation. The suggestion is that low achieving students derived substantial benefit from the skill development program. Similar projections for the high achieving students may be precluded by the low ceiling of a diagnostic test. Furthermore, the generally higher scores in School B may have been depressed by the low ceiling of the test, thus preventing larger gains.] Raw scores from reading subtests of the Stanford Achievement Tests are summarized in Table 5. While the

Table 5

Mean Performance in Raw Scores of Third Grade Pupils on Standard Achievement Reading Subtests in March, 1969 and March, 1970. School B. (from Quilling)

	March, 1969	March, 1970
Word Meaning	22.5	22.2
Paragraph Meaning	35.7	34.2
Word Study Skills	39.6	40.9

1970 scores might be explained in terms of the early testing date and the fact that implementation had proceeded for only five months, it is gratifying to note the gain in word-study skills, which is the main thrust of the word attack phase of the Design.

Taken together the pilot data are encouraging. The impact of the word attack program on independent measures of word attack skills is positive and unequivocal. The impact on more general test performance

is not so straightforward; but the fact remains that the comprehension and study skills phases of the Design are yet to be implemented.

3. Whether a school faculty can realistically set and pursue specific skill development goals was examined.

Data were gathered from one school in which goals were set in the fall and skills were assessed in the spring. In general, the goals set were attained. (See Table 6 on page 17.) The suggestion is that teachers can realistically set and successfully pursue specific skill attainment goals. That is, they can cope with an approach that pays explicit attention to an array of specific skills.

To sum up, we feel that the logic of pursuing a skill oriented approach to reading instruction is very appealing. We have, after a great deal of developmental work, devised a system for implementing such an approach. To the present time we have evidence that essential skills have been identified--at least in the area of word attack--and that teachers can in fact cope with a focusing on multiple skills in terms of realistic goal setting and goal attainment. There is evidence, too, that when the word attack program is implemented there is a measurable impact on related, but independent test scores. A much more extensive field test is now underway and definitive data on the word attack phase are forthcoming in the spring of 1971. The field test is to be extended to study skills in 1971-72 and to comprehension skills in 1972-73.

Table 6

Percent of Word Attack Skills
Mastered at Given Levels:
Projections and Performance
(from Quilling and Graper, 1970)

IQ Range	Skill Development Level	Years of School Completed 1	3	5	7
60-79	A	42/-*	100/91*	100/100	100/100
	B	0/-	42/27	70/75	84/100
	C	0/-	0/0	35/28	55/88
	D	0/-	0/0	0/6	14/63
80-94	A	70/54	100/97	100/100	100/100
	B	7/2	52/54	91/93	100/100
	C	0/0	0/27	35/62	70/99
	D	0/0	0/4	14/26	56/81
95-109	A	84/64	100/100	100/100	100/100
	B	14/2	63/77	100/99	100/100
	C	0/0	21/53	80/93	100/100
	D	0/0	0/14	70/49	84/93
110-140	A	100/73	100/100	100/100	100/100
	B	21/5	77/81	100/100	100/100
	C	0/0	21/59	100/97	100/100
	D	0/0	7/16	100/69	100/96

* Projected Percent of Mastery/Actual Performance

- Indicates no subjects in this category

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